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ABSTRACT

This list consists of essential competencies from the following specialized Ohio Competency Analysis Profiles: Floriculutre and Greenhouse Worker; Nursery and Garden Center Worker; and Turf and Landscape Worker. Developed through a modified DACUM (Developing a Curriculum) process involving business, industry, labor, and community agency representatives in Ohio, this document is a comprehensive and verified employer competency profile for horticulture occupations. The list contains units (with and without subunits), competencies, and competency builders that identify the skills needed to enter these occupations. The occupational, academic, and employability skills for this occupational area are included. Within the outline are three levels of items: core, advancing, and futuring. Core items identify the knowledge, skills, and attitudes essential for entry-level employment. These items are required to be taught and will be the basis for questions on the state vocational competency tests. Advancing items identify the knowledge, skills, and attitudes needed to advance in the occupation; futuring items identify the knowledge, skills, and attitudes needed to enter and remain in a given occupation 3 to 4 years from now. Titles of the 10 units are as follows: general safety precautions; marketing and sales; merchandise handling; business management; facility maintenance; equipment maintenance; equipment operation; employability skills; floriculture and greenhouse management; and turf, landscape, and nursery operations. (YLB)

ED345075

OCAP

OHIO'S COMPETENCY ANALYSIS PROFILE

HORTICULTURE

This list consists of essential competencies from the following specialized OCAPs:

Floriculture and Greenhouse Worker

Nursery and Garden Center Worker

Turf and Landscape Worker

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Ohio's Future at Work

Division of Vocational and Career Education
Ohio Department of Education

Vocational Instructional Materials Laboratory
Center on Education and Training for Employment
THE OHIO STATE UNIVERSITY

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What is OCAP?

"A comprehensive and verified employer competency list will be developed and kept current for each program." This is the second objective of Imperative 3 of the *Action Plan for Accelerating the Modernization of Vocational Education: Ohio's Future at Work*. Ohio's Competency Analysis Profile (OCAP) lists are the Division of Vocational and Career Education's response to that objective. OCAP lists evolve from a modified DACUM process involving business, industry, labor, and community agency representatives from throughout Ohio. The OCAP process is directed by the Vocational Instructional Materials Laboratory at The Ohio State University's Center on Education and Training for Employment.

How is OCAP used?

Each OCAP contains units (with and without subunits), competencies, and competency builders that identify the occupational, academic,* and employability skills needed to enter a given occupation or occupational area. Within that outline there are three levels of items: core, advancing, and futuring. Core items identify the knowledge, skills, and attitudes essential for entry-level employment. These items will be the basis for questions on the state vocational competency tests (scheduled to begin in school year 1993-94). Advancing items (marked with one asterisk) identify the knowledge, skills, and attitudes needed to advance in a given occupation. Futuring items (marked with two asterisks) identify the knowledge, skills, and attitudes needed to enter and remain in a given occupation three to four years from now.

School districts may add as many units, subunits, competencies, and/or competency builders as desired to reflect local employment needs, trends, and specialties. Local advisory committees should be actively involved in the identification and verification of additional items. Using OCAP lists, instructors will be able to formulate their vocational courses of study and monitor competency gains via the new criterion-referenced competency testing program that will be directly tied to the competencies identified on the OCAP lists.

***Academic competencies have not been identified for all OCAPs. At a later date math, communication, and science competencies will be released.**

The **Employability Skills** portion of this list was verified by the following employer panel:

Gary J. Corrigan, *Dana Corporation*, Ottawa Lake, Michigan
David Crooks, *Bowling Green State University Union Food Service*, Bowling Green, Ohio
Pat Doerman, *Farrow's Harley-Davidson*, Columbus, Ohio
William Gockenbach, *Kaiser Aluminum*, Heath, Ohio
Patsy Hathaway, *CBS Personnel Services, Inc.*, Dayton, Ohio
Marlyn Harman, *Marlyn Harman & Associates*, Cleveland, Ohio
Thomas R. Hyldahl, *Toledo Edison*, Toledo, Ohio
Carol C. James, *Ohio Contractors Association*, Columbus, Ohio
James Mack, *Chrysler Jeep Assembly*, Toledo, Ohio
Rocky McCoy, *Ironton-Lawrence Co. Community Action Organization*, Ironton, Ohio
James Needs, *Independent Crop Producer*, Upper Sandusky, Ohio
Ronald Simmons, *Former GM Executive*, Warren Ohio

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Ohio Competency Analysis Profile
Horticulture

Unit 1: General Safety Precautions

Competency 1.0.1: Maintain safe work environment

Competency Builders:

1.0.1.1 Read, comprehend, and follow safety information
1.0.1.2 Organize and maintain clean and safe work area
1.0.1.3 Identify hazardous materials and location of material safety data sheets (MSDSs)
1.0.1.4 Comply with shop and equipment safety rules
1.0.1.5 Complete detailed accident report
1.0.1.6 Recognize environmental and safety issues pertaining to the industry, health administration, Environmental Protection Agency (EPA), Food and Drug Administration (FDA), Occupational Safety and Health Administration (OSHA), and state and federal regulations
1.0.1.7 Identify and report safety hazards
1.0.1.8 Install and maintain safety devices
1.0.1.9 Comply with general-use and restricted-use product regulations
1.0.1.10 Notify superior about incidents
1.0.1.11 Monitor company regulation updates
1.0.1.12 Correct nonchemical safety hazards
1.0.1.13 Supervise employees' compliance with company regulations regarding controlled-substance use*
1.0.1.14 Correct chemical safety hazards*

Competency 1.0.2: Demonstrate safe work habits

Competency Builders:

1.0.2.1 Read and follow label information
1.0.2.2 Wear protective clothing and equipment
1.0.2.3 Use safe lifting and carrying methods
1.0.2.4 Interpret information on signs
1.0.2.5 Check working condition of safety equipment and personal protective equipment
1.0.2.6 Report malfunctioning of safety equipment and personal protective equipment
1.0.2.7 Maintain and use slow-moving-vehicle signs when operating vehicles on road
1.0.2.8 Keep riders off mobile equipment
1.0.2.9 Recognize safety precautions for applying, storing, and handling chemicals and fertilizer
1.0.2.10 Recognize individual's role in safety
1.0.2.11 Reuse and recycle wastewater safely
1.0.2.12 Observe safety precautions when handling chemical or fertilizer spill
1.0.2.13 Observe safety precautions when applying chemicals and fertilizer

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* Advancing
** Futuring

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1.0.2.14 Observe safety precautions when storing chemicals and fertilizer
1.0.2.15 Follow personal cleanup procedures after handling chemicals and fertilizer
1.0.2.16 Dispose of chemicals and chemical containers according to manual specifications and/or government regulations

Competency 1.0.3: Operate and maintain equipment

Competency Builders:

1.0.3.1 Follow safety rules for equipment operation and maintenance
1.0.3.2 Observe and comply with safety zones around equipment
1.0.3.3 Operate equipment defensively
1.0.3.4 Interpret safety symbols
1.0.3.5 Maintain safety shields on all equipment
1.0.3.6 Shut down and lock out/tag out power equipment before servicing
1.0.3.7 Identify and report potential equipment safety hazards
1.0.3.8 Follow manufacturer's service recommendations
1.0.3.9 Maintain valid driver's license and driving record
1.0.3.10 Correct equipment safety hazards*

Unit 2: Marketing and Sales

Competency 2.0.1: Maintain company image

Competency Builders:

2.0.1.1 Explain importance of image
2.0.1.2 Identify factors affecting image
2.0.1.3 Project company image
2.0.1.4 Exhibit good personal hygiene
2.0.1.5 Perform quality work
2.0.1.6 Follow instructions
2.0.1.7 Keep equipment clean
2.0.1.8 Follow dress code
2.0.1.9 Handle customer complaints
2.0.1.10 Communicate positively with customers
2.0.1.11 Read company manual
2.0.1.12 Maintain continuity and uniformity of company logo

Competency 2.0.2: Demonstrate presale skills

Competency Builders:

2.0.2.1 Maintain product and service knowledge
2.0.2.2 Differentiate product features and product benefits
2.0.2.3 Examine types of selling techniques
2.0.2.4 Identify types of customers
2.0.2.5 Recognize customer buying motives
2.0.2.6 Recognize customer buying signals
2.0.2.7 Maintain prospective customer relationship
2.0.2.8 Close sale

* Advancing
** Futuring

Competency 2.0.3: Conduct sale

Competency Builders:

2.0.3.1 Greet customers
2.0.3.2 Use appropriate selling technique
2.0.3.3 Use appropriate questioning technique
2.0.3.4 Determine customer needs
2.0.3.5 Describe services
2.0.3.6 Use support services
2.0.3.7 Develop telephone skills
2.0.3.8 Process tax-exempt sales transaction
2.0.3.9 Process charge account sales transaction
2.0.3.10 Process charge card sales transaction
2.0.3.11 Calculate customer discount
2.0.3.12 Complete sales tickets
2.0.3.13 Complete sales slip
2.0.3.14 Compute sales tax
2.0.3.15 Close sale
2.0.3.16 Operate cash register
2.0.3.17 Count change
2.0.3.18 Process customer refund
2.0.3.19 Wrap purchases
2.0.3.20 Follow up purchases and sales
2.0.3.21 Handle special orders
2.0.3.22 Record sales information
2.0.3.23 Use product demonstrations, exhibits, and displays
2.0.3.24 Sell complementary products
2.0.3.25 Overcome customer objections*
2.0.3.26 Resolve customer complaints*

Competency 2.0.4: Advertise products and services

Competency Builders:

2.0.4.1 Plan presentation
2.0.4.2 Prepare advertising materials*
2.0.4.3 Select signs*

Competency 2.0.5: Market products and services

Competency Builders:

2.0.5.1 Locate market information sources
2.0.5.2 Identify products and services to be presented
2.0.5.3 Identify opportunities for publicity
2.0.5.4 Compare types and costs of advertising media
2.0.5.5 Prepare product demonstrations, exhibits, and displays
2.0.5.6 Arrange retail area according to season
2.0.5.7 Determine when to market*
2.0.5.8 Identify target markets*
2.0.5.9 Identify potential buyers*
2.0.5.10 Identify distribution channels*
2.0.5.11 Analyze competition*
2.0.5.12 Develop marketing goals*

* Advancing
** Futuring

Competency 2.0.6: Price merchandise

Competency Builders:

2.0.6.1 Calculate break-even point
2.0.6.2 Calculate markup
2.0.6.3 Identify psychological effects of pricing
2.0.6.4 Attach price tags
2.0.6.5 Prepare merchandise for inventory or display
2.0.6.6 Identify factors affecting prices
2.0.6.7 Compare pricing strategies*
2.0.6.8 Estimate fixed and variable expenses*
2.0.6.9 Price merchandise*

Competency 2.0.7: Determine customer needs and services

Competency Builders:

2.0.7.1 Interpret customer needs
2.0.7.2 Identify available products
2.0.7.3 Recommend products
2.0.7.4 Recommend alternate products
2.0.7.5 Estimate quantity of needed product
2.0.7.6 Estimate total cost of needed product

Competency 2.0.8: Provide technical assistance

Competency Builders:

2.0.8.1 Provide customer with informative materials
2.0.8.2 Interpret product labels
2.0.8.3 Provide care and safety instructions
2.0.8.4 Demonstrate product use
2.0.8.5 Explain safety precautions regarding product use or application
2.0.8.6 Determine extent of product guarantee
2.0.8.7 Address customer complaints
2.0.8.8 Determine when merchandise is to be delivered
2.0.8.9 Provide specialized care instructions*

Unit 3: Merchandise Handling

Competency 3.0.1: Receive merchandise

Competency Builders:

3.0.1.1 Follow general safety precautions
3.0.1.2 Unload merchandise
3.0.1.3 Distribute merchandise to designated location
3.0.1.4 Interpret packing slips and invoices
3.0.1.5 Check merchandise for shipping discrepancies
3.0.1.6 Inspect products for damage
3.0.1.7 Unpack merchandise
3.0.1.8 Group products according to quality and variety

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3.0.1.9 Handle products according to type
3.0.1.10 Report discrepancies and damages to superior
3.0.1.11 Verify order

Competency 3.0.2: Prepare and load merchandise

Competency Builders:

3.0.2.1 Follow general safety precautions
3.0.2.2 Attach shipping labels
3.0.2.3 Load merchandise
3.0.2.4 Secure load
3.0.2.5 Arrange product delivery
3.0.2.6 Collect COD orders
3.0.2.7 Unload products
3.0.2.8 Verify customer address
3.0.2.9 Follow government regulations
3.0.2.10 Record shipments
3.0.2.11 Prepare shipping packages
3.0.2.12 Assemble shipping cartons
3.0.2.13 Package cuttings for shipment
3.0.2.14 Package, tag, and pack plants and flowers
3.0.2.15 Box and crate large plants
3.0.2.16 Control quality
3.0.2.17 Prepare and attach delivery tag
3.0.2.18 Prepare shipping documents*
3.0.2.19 Determine delivery route*
3.0.2.20 Process special orders*
3.0.2.21 Process returns to vendors*
3.0.2.22 Calculate shipping charges*

Unit 4: Business Management

Competency 4.0.1: Perform general office duties

Competency Builders:

4.0.1.1 Follow general safety precautions
4.0.1.2 Duplicate materials
4.0.1.3 File materials
4.0.1.4 Prepare reports
4.0.1.5 Use telephone
4.0.1.6 Operate calculator
4.0.1.7 Use two-way radio
4.0.1.8 Operate computer
4.0.1.9 Interpret computer printouts
4.0.1.10 Use fax machine
4.0.1.11 Record invoice records
4.0.1.12 Schedule appointments and meetings

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* Advancing
** Futuring

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4.0.1.13 Repair minor malfunctions of office equipment
4.0.1.14 Open business facility
4.0.1.15 Close business facility
4.0.1.16 Type prepared correspondence
4.0.1.17 Use electronic communication systems
4.0.1.18 Balance cash drawer
4.0.1.19 Plan work schedules
4.0.1.20 Maintain service records
4.0.1.21 Process mail*
4.0.1.22 Secure business documents*

Competency 4.0.2: Control inventory

Competency Builders:

4.0.2.1 Organize storage area
4.0.2.2 Conduct physical inventory of merchandise, structures, and equipment
4.0.2.3 Identify high-activity and low-activity items
4.0.2.4 Maintain inventory records
4.0.2.5 Rotate stock
4.0.2.6 Identify turnover rate factors
4.0.2.7 Report minimum inventory levels needed
4.0.2.8 Maintain dump records
4.0.2.9 Determine quantity of bulk items
4.0.2.10 Organize sales area*

Competency 4.0.3: Conduct general banking procedures*

Competency Builders:

4.0.3.1 Prepare funds for bank deposit*
4.0.3.2 Make bank deposit*
4.0.3.3 Write checks*
4.0.3.4 Endorse checks*
4.0.3.5 Balance bank statement*

Competency 4.0.4: Keep customer accounts

Competency Builders:

4.0.4.1 Verify customer addresses
4.0.4.2 Post receipts
4.0.4.3 Post purchases
4.0.4.4 Post accounts payable
4.0.4.5 Set up customer file*
4.0.4.6 Balance customer accounts*
4.0.4.7 Prepare statements*
4.0.4.8 Prepare invoices*
4.0.4.9 Check customer credit reference information*

Competency 4.0.5: Store merchandise

Competency Builders:

4.0.5.1 Follow general safety precautions
4.0.5.2 Update merchandise prices
4.0.5.3 Maintain quality-control records

Competency 4.0.6: Order merchandise*

Competency Builders:

4.0.6.1 Assess merchandise seasonality*
4.0.6.2 Determine what to order*
4.0.6.3 Determine quantity to order*
4.0.6.4 Determine when to order*
4.0.6.5 Use price lists and catalogs*
4.0.6.6 Prepare stock orders*
4.0.6.7 Prepare purchase orders*
4.0.6.8 Make maximum use of vendor discounts*
4.0.6.9 Calculate shipping charges*
4.0.6.10 Prepare daily, weekly, and monthly stock orders*
4.0.6.11 Select vendors*
4.0.6.12 Order replacement parts*
4.0.6.13 Determine amount of storage needed*

Unit 5: Facility Maintenance

Competency 5.0.1: Construct with concrete

Competency Builders:

5.0.1.1 Follow general safety precautions
5.0.1.2 Select concrete materials and additives
5.0.1.3 Select concrete tools
5.0.1.4 Calculate volume of concrete to order or mix
5.0.1.5 Excavate structure sites for concrete pouring
5.0.1.6 Install concrete reinforcement
5.0.1.7 Build and remove concrete forms
5.0.1.8 Mix and pour concrete
5.0.1.9 Finish concrete surface
5.0.1.10 Cure concrete
5.0.1.11 Use survey level*
5.0.1.12 Lay block*
5.0.1.13 Lay brick*
5.0.1.14 Install concrete edging*
5.0.1.15 Select and use power concrete tools*

Competency 5.0.2: Construct with wood

Competency Builders:

5.0.2.1 Follow general safety precautions
5.0.2.2 Cut lumber to dimension
5.0.2.3 Install and repair bracing
5.0.2.4 Cut and fit joints
5.0.2.5 Select and use metal fasteners
5.0.2.6 Assemble joints with glue
5.0.2.7 Cut and set timber and poles
5.0.2.8 Install and repair siding
5.0.2.9 Select types of wood*
5.0.2.10 Install and repair doors*
5.0.2.11 Construct wood structures*

Competency 5.0.3: Install and maintain water delivery systems

Competency Builders:

5.0.3.1 Follow general safety precautions
5.0.3.2 Tap into existing waterlines
5.0.3.3 Locate existing underground waterlines
5.0.3.4 Open trench line
5.0.3.5 Backfill trenches
5.0.3.6 Cut and fit pipe or tubing (e.g., polyvinyl chloride [PVC], aluminum)
5.0.3.7 Install pipe and pipe fittings
5.0.3.8 Install and repair valves and faucets
5.0.3.9 Winterize water delivery systems
5.0.3.10 Maintain filter system
5.0.3.11 Replace gaskets
5.0.3.12 Unclog pipes
5.0.3.13 Install insulation
5.0.3.14 Test and adjust sprinkler spray patterns
5.0.3.15 Repair access wall
5.0.3.16 Maintain automatic waterers
5.0.3.17 Install sprinkler heads and mist heads
5.0.3.18 Repair lines and nozzles on spray equipment
5.0.3.19 Repair broken pipes, sprinkler heads, mist heads, and valves
5.0.3.20 Identify types of pipe, pipe fittings, insulation, and plumbing fixtures
5.0.3.21 Thread metal pipe
5.0.3.22 Troubleshoot problems
5.0.3.23 Bore and sleeve pipe*
5.0.3.24 Install flow-control devices*

Competency 5.0.4: Maintain nursery and greenhouse equipment and facilities

Competency Builders:

5.0.4.1 Follow general safety precautions
5.0.4.2 Clean, fumigate, and sanitize facility
5.0.4.3 Replace and repair plastic covering on greenhouse structure
5.0.4.4 Clean heating and cooling systems
5.0.4.5 Hang and repair doors
5.0.4.6 Replace windowpanes
5.0.4.7 Follow written assembly instructions
5.0.4.8 Replace damaged sections of saran or black cloth
5.0.4.9 Replace damaged support wires for saran or black cloth
5.0.4.10 Construct and repair benches and frames
5.0.4.11 Shade greenhouse glass
5.0.4.12 Clean and lubricate parts
5.0.4.13 Operate ventilation systems
5.0.4.14 Adjust belts on equipment
5.0.4.15 Troubleshoot problems
5.0.4.16 Fumigate facility*
5.0.4.17 Inspect assembled equipment for operating defects*
5.0.4.18 Install plastic covering on greenhouse structure*

Unit 6: Equipment Maintenance

Competency 6.0.1: Service wheels and tires

Competency Builders:

6.0.1.1 Follow general safety precautions
6.0.1.2 Check tire pressure
6.0.1.3 Inflate tires
6.0.1.4 Check and tighten lug nuts
6.0.1.5 Remove and replace flat tires
6.0.1.6 Rotate tires
6.0.1.7 Inspect tires
6.0.1.8 Check valve stems
6.0.1.9 Patch tubes
6.0.1.10 Troubleshoot problems

Competency 6.0.2: Use and maintain hand and power tools

Competency Builders:

6.0.2.1 Follow general safety precautions
6.0.2.2 Follow operation instructions
6.0.2.3 Identify tools
6.0.2.4 Select tools
6.0.2.5 Set up and adjust tools
6.0.2.6 Clean and lubricate tools
6.0.2.7 Recondition tools

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* Advancing
** Futuring

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6.0.2.8 Sharpen tools
6.0.2.9 Store tools
6.0.2.10 Report damaged tools
6.0.2.11 Troubleshoot problems

Competency 6.0.3: Apply protective coatings

Competency Builders:

6.0.3.1 Follow general safety precautions
6.0.3.2 Clean and sand surface
6.0.3.3 Apply masking tape
6.0.3.4 Thin paint
6.0.3.5 Mix and apply primer coat
6.0.3.6 Apply finish coat
6.0.3.7 Apply wood preservative
6.0.3.8 Use steam and high-pressure wash equipment
6.0.3.9 Identify application methods
6.0.3.10 Clean equipment
6.0.3.11 Identify types of coatings
6.0.3.12 Determine type of coating*

Unit 7: Equipment Operation

Competency 7.0.1: Perform predeparture functions

Competency Builders:

7.0.1.1 Follow general safety precautions
7.0.1.2 Refuel power units
7.0.1.3 Check and add fluids
7.0.1.4 Check tires and tire pressure
7.0.1.5 Clean and sanitize inside and outside of vehicle
7.0.1.6 Inspect working condition of lights
7.0.1.7 Check mirrors
7.0.1.8 Maintain service schedule
7.0.1.9 Select fuel
7.0.1.10 Check prestart mechanism
7.0.1.11 Flag extended materials
7.0.1.12 Inspect and adjust belts
7.0.1.13 Add coolant
7.0.1.14 Inspect for leaks
7.0.1.15 Select oil
7.0.1.16 Service air cleaner
7.0.1.17 Identify type of fuel
7.0.1.18 Mix gas and oil for two-cycle engine
7.0.1.19 Secure all equipment and materials
7.0.1.20 Connect front-end-operated equipment
7.0.1.21 Connect 3-point-hitch equipment

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7.0.1.22 Attach and detach power takeoff equipment
7.0.1.23 Hitch towed equipment
7.0.1.24 Connect hydraulic lines
7.0.1.25 Connect electrical hookups
7.0.1.26 Connect safety chains
7.0.1.27 Troubleshoot problems

Competency 7.0.2: Operate equipment and vehicles

Competency Builders:

7.0.2.1 Follow general safety precautions
7.0.2.2 Adjust throttle for operating conditions
7.0.2.3 Interpret equipment gauges
7.0.2.4 Start, operate, and shut down engine
7.0.2.5 Use hand operating signals
7.0.2.6 Operate manual transmission
7.0.2.7 Operate automatic transmission
7.0.2.8 Operate hydrostatic transmission
7.0.2.9 Preheat diesels
7.0.2.10 Secure vehicle when parked
7.0.2.11 Set out safety markers
7.0.2.12 Flag extended materials
7.0.2.13 Operate winch
7.0.2.14 Operate snowplow
7.0.2.15 Operate utility vehicles
7.0.2.16 Use brake systems
7.0.2.17 Adjust seating and steering
7.0.2.18 Operate liftgates
7.0.2.19 Operate dump beds
7.0.2.20 Operate hydraulics
7.0.2.21 Operate power takeoff
7.0.2.22 Jump-start vehicle
7.0.2.23 Operate boom truck (i.e., cherry picker)*

Unit 8: Employability Skills

Subunit 8.1: Career Development

Competency 8.1.1: Investigate career options

Competency Builders:

8.1.1.1 Determine interests and aptitudes
8.1.1.2 Identify career options
8.1.1.3 Research occupations matching interests and aptitudes
8.1.1.4 Select career(s) that best match(es) interests and aptitudes
8.1.1.5 Identify advantages and disadvantages of career options, including nontraditional careers
8.1.1.6 Assess differences in wages, annual incomes, and job opportunities based on geographic location
8.1.1.7 Develop a career plan

* Advancing
** Futuring

Competency 8.1.2: Analyze potential barriers to employment

Competency Builders:

8.1.2.1 Identify common barriers to employment
8.1.2.2 Describe strategies to overcome employment barriers

Unit 8: Employability Skills
Subunit 8.2: Decision Making and Problem Solving

Competency 8.2.1: Apply decision-making techniques in the workplace

Competency Builders:

8.2.1.1 Identify the decision to be made
8.2.1.2 Compare alternatives
8.2.1.3 Determine consequences of each alternative
8.2.1.4 Make decisions based on values and goals
8.2.1.5 Evaluate the decision made

Competency 8.2.2: Apply problem-solving techniques in the workplace

Competency Builders:

8.2.2.1 Diagnose the problem and its causes
8.2.2.2 Identify alternatives and their consequences in relation to the problem
8.2.2.3 Examine multicultural and nonsexist dimensions of problem solving
8.2.2.4 Utilize resources to explore possible solutions to the problem
8.2.2.5 Compare and contrast the advantages and disadvantages of each solution
8.2.2.6 Determine appropriate action
8.2.2.7 Evaluate results

Unit 8: Employability Skills
Subunit 8.3: Work Ethic

Competency 8.3.1: Evaluate the relationship of self-esteem to work ethic

Competency Builders:

8.3.1.1 Identify special characteristics and abilities in self and others
8.3.1.2 Identify internal and external factors that affect self-esteem

Competency 8.3.2: Analyze the relationship of personal values and goals to work ethic both in and out of the workplace

Competency Builders:

8.3.2.1 Distinguish between values and goals
8.3.2.2 Determine the importance of values and goals
8.3.2.3 Evaluate how values affect goals
8.3.2.4 Identify short-term and long-term goals
8.3.2.5 Prioritize personal goals
8.3.2.6 Describe how personal values are reflected in work ethic
8.3.2.7 Describe how interactions in the workplace affect personal work ethic
8.3.2.8 Examine how life changes affect personal work ethic

Competency 8.3.3: Demonstrate work ethic

Competency Builders:

8.3.3.1 Examine factors that influence work ethic
8.3.3.2 Exhibit characteristics that reflect an appropriate work ethic

Unit 8: Employability Skills

Subunit 8.4: Job-Seeking Skills

Competency 8.4.1: Prepare for employment

Competency Builders:

8.4.1.1 Identify traditional and nontraditional employment sources
8.4.1.2 Utilize employment sources
8.4.1.3 Research job opportunities, including nontraditional careers
8.4.1.4 Interpret equal employment opportunity laws
8.4.1.5 Explain the critical importance of personal appearance, hygiene, and demeanor throughout the employment process
8.4.1.6 Prepare for generic employment tests and those specific to an occupation/organization

Competency 8.4.2: Design a résumé

Competency Builders:

8.4.2.1 Identify personal strengths and weaknesses
8.4.2.2 List skills and/or abilities, career objective(s), accomplishments/achievements, educational background, and work experience
8.4.2.3 Demonstrate legible written communication skills using correct grammar, spelling, and concise wording
8.4.2.4 Complete résumé using various formats
8.4.2.5 Secure references

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Competency 8.4.3: Complete and process job application forms

Competency Builders:

8.4.3.1 Explain the importance of an application form
8.4.3.2 Identify ways to obtain job application forms
8.4.3.3 Describe methods for handling illegal questions on job application forms
8.4.3.4 Demonstrate legible written communication skills using correct grammar, spelling, and concise wording
8.4.3.5 Return application to proper person, request interview, and follow up

Competency 8.4.4: Demonstrate interviewing skills

Competency Builders:

8.4.4.1 Investigate interview environment and procedures
8.4.4.2 Explain the critical importance of personal appearance, hygiene, and demeanor
8.4.4.3 Demonstrate question and answer techniques
8.4.4.4 Demonstrate methods for handling difficult and/or illegal interview questions

Competency 8.4.5: Secure employment

Competency Builders:

8.4.5.1 Identify present and future employment opportunities within an occupation/organization
8.4.5.2 Research the organization/company
8.4.5.3 Use follow-up techniques to enhance employment potential
8.4.5.4 Compare and evaluate job offers

Unit 8: Employability Skills

Subunit 8.5: Job Retention Skills

Competency 8.5.1: Analyze the organizational structure of the workplace

Competency Builders:

8.5.1.1 Identify and evaluate employer expectations regarding job performance, work habits, attitudes, personal appearance, and hygiene
8.5.1.2 Be aware of and obey all company policies and procedures
8.5.1.3 Examine the role/relationship between employee and employer
8.5.1.4 Recognize opportunities for advancement and reasons for termination

Competency 8.5.2: Maintain positive relations with others

Competency Builders:

8.5.2.1 Exhibit appropriate work habits and attitude
8.5.2.2 Identify behaviors to establish successful working relationships
8.5.2.3 Cooperate and compromise through teamwork and group participation
8.5.2.4 Identify alternatives for dealing with harassment, bias, and discrimination based on race, color, national origin, sex, religion, handicap, or age

Unit 8: Employability Skills
Subunit 8.6: Job Advancement

Competency 8.6.1: Analyze opportunities for personal and career growth

Competency Builders:

8.6.1.1 Determine opportunities within an occupation/organization
8.6.1.2 Compare and contrast other opportunities
8.6.1.3 List benefits of job advancement
8.6.1.4 Evaluate factors involved when assuming a new position within or outside an occupation/organization

Competency 8.6.2: Exhibit characteristics needed for advancement

Competency Builders:

8.6.2.1 Display a positive attitude
8.6.2.2 Demonstrate knowledge of a position
8.6.2.3 Perform quality work
8.6.2.4 Adapt to changing situations and technology
8.6.2.5 Demonstrate capability for different positions
8.6.2.6 Participate in continuing education/training programs
8.6.2.7 Respect, accept, and work with ALL individuals in the workplace

Unit 8: Employability Skills
Subunit 8.7: Technology in the Workplace

Competency 8.7.1: Assess the impact of technology in the workplace

Competency Builders:

8.7.1.1 Cite how past business/industry practices have influenced present business/industry processes
8.7.1.2 Investigate the use of technology in the workplace
8.7.1.3 Analyze how present skills can be applied to learning new technologies

Competency 8.7.2: Use a variety of technological applications

Competency Builders:

8.7.2.1 Explore basic mathematical, scientific, computer, and technological principles
8.7.2.2 Use technology to accomplish assigned tasks
8.7.2.3 Create solutions to problems using technical means

Unit 8: Employability Skills
Subunit 8.8: Lifelong Learning

Competency 8.8.1: Apply lifelong learning to individual situations

Competency Builders:

8.8.1.1 Define lifelong learning
8.8.1.2 Identify factors that cause the need for lifelong learning

Competency 8.8.2: Adapt to change

Competency Builders:

8.8.2.1 Analyze the effects of change
8.8.2.2 Identify reasons why goals change
8.8.2.3 Describe the importance of flexibility when reevaluating goals
8.8.2.4 Evaluate the need for continuing education/training

Unit 8: Employability Skills
Subunit 8.9: Economic Education

Competency 8.9.1: Analyze global enterprise system

Competency Builders:

8.9.1.1 Identify characteristics of various enterprise systems
8.9.1.2 Examine the relationship between competition, risk, and profit
8.9.1.3 Illustrate how supply and demand influence price

Competency 8.9.2: Evaluate personal money management

Competency Builders:

8.9.2.1 Describe the need for personal management records
8.9.2.2 Identify methods of taxation
8.9.2.3 Analyze how credit affects financial security
8.9.2.4 Compare types and methods of investments
8.9.2.5 Prepare a personal budget
8.9.2.6 Be an informed and responsible consumer
8.9.2.7 Analyze the effects of advertising on the consumer

Unit 8: Employability Skills
Subunit 8.10: Balancing Work and Family

Competency 8.10.1: Analyze the effects of family on work

Competency Builders:

8.10.1.1 Recognize how family values, goals, and priorities are reflected in the workplace
8.10.1.2 Identify present and future family structures and responsibilities
8.10.1.3 Describe personal and family roles
8.10.1.4 Analyze concerns of working parent(s)
8.10.1.5 Examine how family responsibilities can conflict with work
8.10.1.6 Resolve family-related conflicts
8.10.1.7 Explain how to use support systems/community resources to help resolve family-related conflicts

Competency 8.10.2: Analyze the effects of work on family

Competency Builders:

8.10.2.1 Identify responsibilities associated with paid and nonpaid work
8.10.2.2 Compare the advantages and disadvantages of multiple incomes
8.10.2.3 Explain how work can conflict with family responsibilities
8.10.2.4 Explain how work-related stress can affect families
8.10.2.5 Identify family support systems and resources

Unit 8: Employability Skills
Subunit 8.11: Citizenship in the Workplace

Competency 8.11.1: Exercise the rights and responsibilities of citizenship in the workplace

Competency Builders:

8.11.1.1 Identify the basic rights and responsibilities of citizenship
8.11.1.2 Examine the history and contributions of all racial, ethnic, and cultural groups

Competency 8.11.2: Cooperate with others in the workplace

Competency Builders:

8.11.2.1 Identify situations in which compromise is necessary
8.11.2.2 Examine how individuals from various backgrounds contribute to work-related situations
8.11.2.3 Demonstrate initiative to facilitate cooperation
8.11.2.4 Give and receive constructive criticism to enhance cooperation

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Unit 8: Employability Skills
Subunit 8.12: Leadership

Competency 8.12.1: Evaluate leadership styles appropriate for the workplace

Competency Builders:

8.12.1.1 Identify characteristics of effective leaders
8.12.1.2 Compare leadership styles
8.12.1.3 Demonstrate effective delegation skills
8.12.1.4 Identify opportunities to lead in the workplace

Competency 8.12.2: Demonstrate effective teamwork skills

Competency Builders:

8.12.2.1 Identify the responsibilities of a valuable group member
8.12.2.2 Exhibit open-mindedness
8.12.2.3 Identify methods of involving each member of a team
8.12.2.4 Contribute to the efficiency and success of a group
8.12.2.5 Determine ways to motivate others

Competency 8.12.3: Utilize effective communication skills

Competency Builders:

8.12.3.1 Identify the importance of listening
8.12.3.2 Demonstrate assertive communication
8.12.3.3 Recognize the importance of verbal and nonverbal cues and messages
8.12.3.4 Analyze written material
8.12.3.5 Prepare written material
8.12.3.6 Give and receive feedback
8.12.3.7 Articulate thoughts
8.12.3.8 Use appropriate language

Unit 8: Employability Skills
Subunit 8.13: Entrepreneurship

Competency 8.13.1: Evaluate the role of small business in the economy

Competency Builders:

8.13.1.1 Identify the benefits of small business to a community
8.13.1.2 Analyze opportunities for small business in a community

Competency 8.13.2: Examine considerations of starting a business

Competency Builders:

8.13.2.1 Research a business idea
8.13.2.2 Compare various ways to become a small business owner
8.13.2.3 Investigate factors to consider in financing a new business
8.13.2.4 Evaluate entrepreneurship as a career option

Unit 9: Floriculture and Greenhouse Management

Subunit 9.1: Greenhouse Plant Production

Competency 9.1.1: Test soil, water, and plant tissues

Competency Builders:

9.1.1.1 Follow general safety precautions
9.1.1.2 Take soil sample
9.1.1.3 Prepare soil to be tested
9.1.1.4 Collect plant tissues to be tested
9.1.1.5 Determine pH level
9.1.1.6 Determine soluble salt levels
9.1.1.7 Take water samples
9.1.1.8 Interpret results of water test*
9.1.1.9 Interpret results of soil test*
9.1.1.10 Interpret results of plant tissue test*

Competency 9.1.2: Prepare media mixes

Competency Builders:

9.1.2.1 Follow general safety precautions
9.1.2.2 Shred and mix planting media materials
9.1.2.3 Pasteurize media
9.1.2.4 Identify media functions
9.1.2.5 Identify media components

Competency 9.1.3: Prepare for propagation

Competency Builders:

9.1.3.1 Follow general safety precautions
9.1.3.2 Identify plants, cuttings, and seedling stock
9.1.3.3 Grade cuttings for size
9.1.3.4 Interpret seed and bulb tag information
9.1.3.5 Identify containers
9.1.3.6 Identify environmental factors of propagation
9.1.3.7 Select media
9.1.3.8 Sanitize propagation equipment, areas, and containers
9.1.3.9 Determine plants, seeds, or cuttings per container*
9.1.3.10 Determine planting depth*
9.1.3.11 Determine plant scheduling*
9.1.3.12 Select seeds and bulbs*

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Competency 9.1.4: Plant and propagate plants

Competency Builders:

9.1.4.1 Follow general safety precautions
9.1.4.2 Sow seeds
9.1.4.3 Plant bulbs
9.1.4.4 Force bulbs
9.1.4.5 Take cuttings
9.1.4.6 Plant cuttings
9.1.4.7 Use rooting hormones
9.1.4.8 Plant plugs
9.1.4.9 Label plants and cuttings
9.1.4.10 Identify propagation problems*
9.1.4.11 Identify mechanical seeders and components*

Competency 9.1.5: Handle and care for plants

Competency Builders:

9.1.5.1 Follow general safety precautions
9.1.5.2 Label plants or cuttings
9.1.5.3 Disbud plants
9.1.5.4 Transplant seedlings and plugs
9.1.5.5 Transplant cuttings
9.1.5.6 Transplant plants
9.1.5.7 Space plants
9.1.5.8 Adjust bedwire or fibered plastic
9.1.5.9 Pinch plants
9.1.5.10 Identify growth-regulating compounds
9.1.5.11 Tie plants to supports
9.1.5.12 Identify material-handling systems
9.1.5.13 Monitor plant growth (i.e., graphical tracking)*
9.1.5.14 Apply growth-regulating compounds*

Competency 9.1.6: Fertilize plants in greenhouse operation

Competency Builders:

9.1.6.1 Follow general safety precautions
9.1.6.2 Interpret fertilizer bag labels
9.1.6.3 Mix fertilizer solutions
9.1.6.4 Apply liquid fertilizer
9.1.6.5 Apply dry fertilizer
9.1.6.6 Use fertilizer injectors
9.1.6.7 Identify fertilization practices and terminology
9.1.6.8 Identify symptoms of nutrient deficiency*
9.1.6.9 Determine kind of fertilizer and lime to apply*
9.1.6.10 Interpret manufacturer's fertilization rate charts*
9.1.6.11 Determine amount of fertilizer and lime to apply*
9.1.6.12 Calibrate fertilizer application equipment*

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Competency 9.1.7: Regulate greenhouse environment

Competency Builders:

9.1.7.1 Follow general safety precautions
9.1.7.2 Install shade cloth
9.1.7.3 Apply glass shading compound
9.1.7.4 Identify supplemental lighting
9.1.7.5 Set timers to regulate lighting
9.1.7.6 Hang lath or saran cloth
9.1.7.7 Use light meters
9.1.7.8 Hand-irrigate plants
9.1.7.9 Adjust irrigation system
9.1.7.10 Adjust cooling system
9.1.7.11 Control humidity
9.1.7.12 Adjust temperatures for plants
9.1.7.13 Identify carbon dioxide levels
9.1.7.14 Identify factors influencing plant growth
9.1.7.15 Identify environmental control systems*

Competency 9.1.8: Plan pest-control program

Competency Builders:

9.1.8.1 Follow general safety precautions
9.1.8.2 Identify insects, diseases, and weeds
9.1.8.3 Recognize pest damage
9.1.8.4 Estimate pest population numbers
9.1.8.5 Identify chemical/cultural/biological control options
9.1.8.6 Interpret chemical labels and compatibility charts
9.1.8.7 Complete certification requirements for prescribed chemical application*
9.1.8.8 Assess degree of damage*

Competency 9.1.9: Harvest greenhouse plants

Competency Builders:

9.1.9.1 Follow general safety precautions
9.1.9.2 Identify harvest stages
9.1.9.3 Cut plants
9.1.9.4 Count and bunch plants
9.1.9.5 Regulate cold-storage unit temperature

Competency 9.1.10: Apply chemical treatments*

Competency Builders:

9.1.10.1 Follow general safety precautions*
9.1.10.2 Calibrate application equipment*
9.1.10.3 Mix chemicals and load application equipment*
9.1.10.4 Use application equipment*
9.1.10.5 Follow proper cleaning and sterilization procedures*
9.1.10.6 Maintain application record*
9.1.10.7 Recognize chemical injury*

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Unit 9: Floriculture and Greenhouse Management
Subunit 9.2: Marketing and Sales

Competency 9.2.1: Maintain customer relations

Competency Builders:

9.2.1.1 Identify factors affecting customer relations
9.2.1.2 Explain importance of customer relations
9.2.1.3 Identify customer expectations
9.2.1.4 Explain service levels offered
9.2.1.5 Recognize value of complaints and compliments

Competency 9.2.2: Display merchandise

Competency Builders:

9.2.2.1 Design displays
9.2.2.2 Set up displays
9.2.2.3 Select items
9.2.2.4 Use foam core and props
9.2.2.5 Identify display areas

Unit 9: Floriculture and Greenhouse Management
Subunit 9.3: Equipment Mechanics

Competency 9.3.1: Compare greenhouse structures

Competency Builders:

9.3.1.1 Follow general safety precautions
9.3.1.2 Identify life expectancy of structure
9.3.1.3 Identify space utilization
9.3.1.4 Identify types of ventilation systems
9.3.1.5 Identify types of structures

Competency 9.3.2: Maintain floral shop equipment and facilities

Competency Builders:

9.3.2.1 Follow general safety precautions
9.3.2.2 Clean and sanitize facilities
9.3.2.3 Clean refrigeration and air-conditioning components
9.3.2.4 Sharpen and lubricate cutting tools
9.3.2.5 Clean storage containers
9.3.2.6 Clean preservative system
9.3.2.7 Troubleshoot refrigeration problems

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Unit 9: Floriculture and Greenhouse Management

Subunit 9.4: Merchandise Handling

Competency 9.4.1: Deliver merchandise

Competency Builders:

9.4.1.1 Follow general safety precautions
9.4.1.2 Determine delivery route
9.4.1.3 Maintain company image
9.4.1.4 Unload merchandise
9.4.1.5 Arrange merchandise delivery

Competency 9.4.2: Process cut flowers and greens

Competency Builders:

9.4.2.1 Follow general safety precautions
9.4.2.2 Identify temperature needs
9.4.2.3 Use proper cutting technique
9.4.2.4 Mix preservatives and treatments
9.4.2.5 Strip foliage
9.4.2.6 Separate flower varieties
9.4.2.7 Identify ethylene sources
9.4.2.8 Identify preservatives and treatments
9.4.2.9 Identify flower needs
9.4.2.10 Select preservatives and treatments*

Competency 9.4.3: Process container plants

Competency Builders:

9.4.3.1 Follow general safety precautions
9.4.3.2 Identify plant needs
9.4.3.3 Clean plants and containers
9.4.3.4 Trim plants
9.4.3.5 Decorate plants and containers
9.4.3.6 Attach care instructions
9.4.3.7 Attach price tags and Universal Product Codes (UPCs)

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Unit 9: Floriculture and Greenhouse Management
Subunit 9.5: Floral Design

Competency 9.5.1: Plan designs and arrangements

Competency Builders:

9.5.1.1 Construct boutonnieres
9.5.1.2 Construct corsages
9.5.1.3 Select flowers
9.5.1.4 Select foliage
9.5.1.5 Select containers
9.5.1.6 Establish lines for arrangement
9.5.1.7 Construct asymmetrical arrangements
9.5.1.8 Construct round arrangements
9.5.1.9 Construct oblong arrangements
9.5.1.10 Construct vertical arrangements
9.5.1.11 Construct horizontal arrangements
9.5.1.12 Construct triangular arrangements
9.5.1.13 Apply color principles
9.5.1.14 Select style for occasion
9.5.1.15 Identify design variations
9.5.1.16 Identify principles of design
9.5.1.17 Identify principles of efficient production of multiple pieces
9.5.1.18 Construct bud vases
9.5.1.19 Construct hand-held bouquets
9.5.1.20 Recognize techniques of using silk and dry materials
9.5.1.21 Arrange fruit baskets

Competency 9.5.2: Prepare materials for arrangements

Competency Builders:

9.5.2.1 Use holding devices
9.5.2.2 Identify flowers
9.5.2.3 Identify foliage
9.5.2.4 Use mechanical aides
9.5.2.5 Cut plants and materials to size
9.5.2.6 Wire and tape materials
9.5.2.7 Select and prepare accessories for arrangements and occasions
9.5.2.8 Make bows
9.5.2.9 Prepare containers
9.5.2.10 Use tulle, ribbon, netting, and lace
9.5.2.11 Spray-tint dried and live floral products
9.5.2.12 Design and construct free-form bouquet*
9.5.2.13 Design and construct hand-tied bouquet*

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Competency 9.5.3: Prepare live plant groupings

Competency Builders:

9.5.3.1 Follow general safety precautions
9.5.3.2 Select plant containers
9.5.3.3 Arrange plants
9.5.3.4 Fill containers with soil
9.5.3.5 Identify live plants
9.5.3.6 Select plants
9.5.3.7 Clean plants and containers

Competency 9.5.4: Prepare wedding flowers*

Competency Builders:

9.5.4.1 Design and construct wedding fans and muffs*
9.5.4.2 Design and construct colonial/nosegay bouquets*
9.5.4.3 Design and construct arm-style bouquets*
9.5.4.4 Design and construct cascade bouquets*
9.5.4.5 Set up and dismantle wedding decorations*
9.5.4.6 Service wedding arrangements*
9.5.4.7 Design boutonnieres*
9.5.4.8 Design corsages*

Competency 9.5.5: Prepare sympathy flowers*

Competency Builders:

9.5.5.1 Design and construct casket spray*
9.5.5.2 Design and construct standing spray or wreaths*
9.5.5.3 Design and construct vases*
9.5.5.4 Identify set pieces*
9.5.5.5 Identify funeral home procedures*
9.5.5.6 Design and construct pillows*

Unit 10: Turf, Landscape, and Nursery Operations

Subunit 10.1: Turf, Landscape, and Nursery Management

Competency 10.1.1: Demonstrate understanding of turf, landscape, and nursery industries

Competency Builders:

10.1.1.1 Identify fields of endeavor
10.1.1.2 Recognize economic importance of industries
10.1.1.3 Recognize environmental importance of industries
10.1.1.4 Identify employment opportunities
10.1.1.5 Recognize regulatory aspects of industries
10.1.1.6 Identify continuing-education opportunities
10.1.1.7 Identify professional organizations and trade journals
10.1.1.8 Identify state licensing requirements
10.1.1.9 Identify Ohio Certified Nursery Technician opportunities
10.1.1.10 Identify physical nature of work

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Competency 10.1.2: Examine plant physiology and growth

Competency Builders:

10.1.2.1 Identify woody and herbaceous plants
10.1.2.2 Identify plant parts
10.1.2.3 Identify photosynthesis process
10.1.2.4 Identify functions of roots, stems, and leaves
10.1.2.5 Identify requirements for healthy plant growth
10.1.2.6 Identify taproot and fibrous root systems
10.1.2.7 Identify differences between evergreen and deciduous plants

Competency 10.1.3: Examine plant requirements and value

Competency Builders:

10.1.3.1 Identify hardiness zones
10.1.3.2 Identify landscape value
10.1.3.3 Identify plant environmental preferences
10.1.3.4 Recognize planting and maintenance levels
10.1.3.5 Identify environmental value

Competency 10.1.4: Identify and classify plants

Competency Builders:

10.1.4.1 Classify turf and landscape plants as monocots or dicots
10.1.4.2 Classify plants as annuals, biennials, or perennials
10.1.4.3 Identify bulbs
10.1.4.4 Identify annual flowers
10.1.4.5 Identify perennial flowers
10.1.4.6 Identify shade trees
10.1.4.7 Identify flowering potted plants
10.1.4.8 Identify foliage plants
10.1.4.9 Identify ornamental grasses
10.1.4.10 Identify ornamental trees
10.1.4.11 Identify shrubs
10.1.4.12 Identify ground covers
10.1.4.13 Identify conifers
10.1.4.14 Identify common plants according to scientific and common names
10.1.4.15 Classify plants according to growth habit
10.1.4.16 Identify wildflowers
10.1.4.17 Identify herbs
10.1.4.18 Identify fruit trees
10.1.4.19 Identify vegetable plants
10.1.4.20 Identify ferns*
10.1.4.21 Identify turfgrasses*
10.1.4.22 Identify vines*

Competency 10.1.5: Plan landscape designs

Competency Builders:

10.1.5.1 Analyze site conditions
10.1.5.2 Identify and use drafting equipment
10.1.5.3 Use color to enhance finished plans
10.1.5.4 Design public area planting*
10.1.5.5 Design drainage system*
10.1.5.6 Design outdoor privacy area*
10.1.5.7 Design theme gardens*
10.1.5.8 Design service area*
10.1.5.9 Design residential planting*
10.1.5.10 Design commercial planting*
10.1.5.11 Design golf courses*
10.1.5.12 Design athletic fields*
10.1.5.13 Create spatial concepts*
10.1.5.14 Coordinate plant requirements and environmental conditions*
10.1.5.15 Select plant and seed varieties*
10.1.5.16 Draw landscape symbols*
10.1.5.17 Draw plan to scale*
10.1.5.18 Evaluate landscape model*

Competency 10.1.6: Test soil, water, and plant tissues

Competency Builders:

10.1.6.1 Follow general safety precautions
10.1.6.2 Take soil samples
10.1.6.3 Take plant samples
10.1.6.4 Prepare soil samples for testing
10.1.6.5 Prepare plant samples for testing
10.1.6.6 Determine soil pH level
10.1.6.7 Determine water pH level
10.1.6.8 Draw water samples
10.1.6.9 Interpret test results
10.1.6.10 Read results of soil and plant tissue tests
10.1.6.11 Determine water soluble salt levels*
10.1.6.12 Interpret results of soil and plant tissue tests*

Competency 10.1.7: Prepare media mixes

Competency Builders:

10.1.7.1 Follow general safety precautions
10.1.7.2 Identify soil types
10.1.7.3 Mix media materials
10.1.7.4 Prepare compost
10.1.7.5 Identify mixing techniques
10.1.7.6 Identify media materials

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Competency 10.1.8: Prepare for landscape and turf installation and propagation

Competency Builders:

10.1.8.1 Follow general safety precautions
10.1.8.2 Prepare seeds for sowing
10.1.8.3 Match plant requirements to environmental conditions
10.1.8.4 Identify asexual and sexual plant propagation methods
10.1.8.5 Identify state licensing requirements
10.1.8.6 Collect and select seeds, plants, and cuttings
10.1.8.7 Interpret plant and seed tag information
10.1.8.8 Identify containers
10.1.8.9 Identify need for sterilizing equipment and containers
10.1.8.10 Read landscape plan
10.1.8.11 Convert scale to site
10.1.8.12 Determine material quantities
10.1.8.13 Identify underground utilities
10.1.8.14 Determine planting time
10.1.8.15 Follow planting rate recommendations
10.1.8.16 Determine planting depth
10.1.8.17 Plan soil erosion controls*
10.1.8.18 Plan planting schedules*

Competency 10.1.9: Prepare planting area

Competency Builders:

10.1.9.1 Follow general safety precautions
10.1.9.2 Define areas
10.1.9.3 Establish rough grade
10.1.9.4 Create contour
10.1.9.5 Prepare planting location
10.1.9.6 Identify and apply soil amendments
10.1.9.7 Incorporate soil amendments
10.1.9.8 Establish finish grade

Competency 10.1.10: Receive and deliver landscape and turfgrass products

Competency Builders:

10.1.10.1 Follow general safety precautions
10.1.10.2 Unload products
10.1.10.3 Unpack products
10.1.10.4 Load products
10.1.10.5 Secure load
10.1.10.6 Monitor quality control
10.1.10.7 Maintain shipping and receiving records*

Competency 10.1.11: Establish turf, landscape, and nursery plants

Competency Builders:

10.1.11.1 Follow general safety precautions
10.1.11.2 Plant seeds
10.1.11.3 Plant bulbs
10.1.11.4 Plant bare root trees and shrubs
10.1.11.5 Plant ground covers
10.1.11.6 Plant annual and perennial plants
10.1.11.7 Plant balled trees and shrubs
10.1.11.8 Water-in plant material
10.1.11.9 Lay sod
10.1.11.10 Apply mulch
10.1.11.11 Take cuttings
10.1.11.12 Sterilize equipment
10.1.11.13 Divide plants
10.1.11.14 Separate plants
10.1.11.15 Perform grafts and buds
10.1.11.16 Pot trees and shrubs
10.1.11.17 Transplant cuttings and seedlings
10.1.11.18 Apply rooting hormone
10.1.11.19 Label planted specimens
10.1.11.20 Troubleshoot problems

Competency 10.1.12: Fertilize plants

Competency Builders:

10.1.12.1 Follow general safety precautions
10.1.12.2 Interpret fertilizer bag labels
10.1.12.3 Mix fertilizer solutions
10.1.12.4 Apply liquid fertilizer
10.1.12.5 Apply dry fertilizer
10.1.12.6 Identify application methods
10.1.12.7 Determine application pattern
10.1.12.8 Identify symptoms of nutrient deficiency
10.1.12.9 Interpret manufacturer's fertilization rate charts
10.1.12.10 Determine amount of fertilizer and soil amendments to apply
10.1.12.11 Recognize symptoms of fertilizer injury
10.1.12.12 Maintain fertilization records
10.1.12.13 Calibrate fertilizer application equipment
10.1.12.14 Use fertilizer injectors*
10.1.12.15 Determine nutrient requirements*
10.1.12.16 Select application method*
10.1.12.17 Determine kind of fertilizer and soil amendments to apply*

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Competency 10.1.13: Plan integrated pest management (IPM) control program

Competency Builders:

10.1.13.1 Follow general safety precautions
10.1.13.2 Identify insects, diseases, and weeds at various development stages
10.1.13.3 Recognize pest damage
10.1.13.4 Identify vertebrate pests
10.1.13.5 Identify control-resistant insects
10.1.13.6 Select application method
10.1.13.7 Compute treatment cost
10.1.13.8 Recognize environmental limitations
10.1.13.9 Select control option
10.1.13.10 Calculate area to be covered
10.1.13.11 Identify appropriate control methods
10.1.13.12 Identify resistant plant species
10.1.13.13 Determine when controls are needed
10.1.13.14 Evaluate chemical/cultural/biological control options of IPM
10.1.13.15 Interpret chemical labels and compatibility charts
10.1.13.16 Complete certification requirements for prescribed chemical application
10.1.13.17 Estimate pest population numbers*
10.1.13.18 Map chemical application*
10.1.13.19 Assess degree of damage*

Competency 10.1.14: Apply chemical treatments for pest control

Competency Builders:

10.1.14.1 Follow general safety precautions
10.1.14.2 Calibrate application equipment
10.1.14.3 Mix chemicals and load application equipment
10.1.14.4 Use application equipment
10.1.14.5 Follow proper cleaning procedures
10.1.14.6 Maintain application record
10.1.14.7 Identify pest baits
10.1.14.8 Determine application pattern
10.1.14.9 Assess treatment results
10.1.14.10 Recognize chemical injury

Competency 10.1.15: Maintain plants

Competency Builders:

10.1.15.1 Follow general safety precautions
10.1.15.2 Disbud flowering plants
10.1.15.3 Thin and space plants
10.1.15.4 Cultivate plants
10.1.15.5 Water plants
10.1.15.6 Identify and apply mulches
10.1.15.7 Prune trees
10.1.15.8 Transplant bulbs, corms, and tubers
10.1.15.9 Clean plant leaves
10.1.15.10 Thin seedlings and cuttings

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10.1.15.11 Repot plants
10.1.15.12 Wrap, stake, and guy trees
10.1.15.13 Climatize plants
10.1.15.14 Treat tree wounds
10.1.15.15 Remove old flowers
10.1.15.16 Remove fallen leaves
10.1.15.17 Pinch plants
10.1.15.18 Apply growth-regulating compounds
10.1.15.19 Maintain plants on arbors and trellises*

Competency 10.1.16: Maintain turfgrasses

Competency Builders:

10.1.16.1 Follow general safety precautions
10.1.16.2 Apply top dressing to turfgrass areas
10.1.16.3 Verticut turf
10.1.16.4 Overseed turf
10.1.16.5 Water turf
10.1.16.6 Aerate turf
10.1.16.7 Renovate turf
10.1.16.8 Fill in holes and depressions in turf
10.1.16.9 Relocate cups and tee markers
10.1.16.10 Slice seed turf
10.1.16.11 Mow turf
10.1.16.12 Grasscycle turf
10.1.16.13 Maintain nutrient levels
10.1.16.14 Trim turf
10.1.16.15 Edge turf
10.1.16.16 Apply growth-regulating compounds*

Competency 10.1.17: Prune plants

Competency Builders:

10.1.17.1 Follow general safety precautions
10.1.17.2 Identify pruning tools
10.1.17.3 Sterilize pruning equipment
10.1.17.4 Determine pruning time
10.1.17.5 Identify structural problems
10.1.17.6 Determine lowest branch height
10.1.17.7 Determine desired shape
10.1.17.8 Identify water sprouts
10.1.17.9 Space branches
10.1.17.10 Select scaffold branches
10.1.17.11 Prune shrubs
10.1.17.12 Root-prune
10.1.17.13 Train central leaders

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Competency 10.1.18: Harvest plants

Competency Builders:

10.1.18.1 Follow general safety precautions
10.1.18.2 Package plants
10.1.18.3 Label plants
10.1.18.4 Clean plants
10.1.18.5 Acclimate plants
10.1.18.6 Grade plants
10.1.18.7 Preserve plant viability
10.1.18.8 Apply antidesiccants
10.1.18.9 Wrap tree head
10.1.18.10 Dig, ball, and burlap shrubs and trees
10.1.18.11 Harvest bare root stock
10.1.18.12 Comply with regulations regarding plant inspection and movement
10.1.18.13 Recognize American Association of Nurserymen (AAN) sizing/grading standards

Competency 10.1.19: Regulate greenhouse environment

Competency Builders:

10.1.19.1 Follow general safety precautions
10.1.19.2 Install shade cloth
10.1.19.3 Apply glass shading compound
10.1.19.4 Control environmental needs
10.1.19.5 Recognize computerized environmental controls
10.1.19.6 Troubleshoot problems

Unit 10: Turf, Landscape, and Nursery Operations
Subunit 10.2: Marketing and Sales

Competency 10.2.1: Prepare estimate

Competency Builders:

10.2.1.1 Calculate square footage and cubic yards
10.2.1.2 Use price list
10.2.1.3 Estimate total amount of materials needed*
10.2.1.4 Estimate labor requirements*
10.2.1.5 Estimate fixed costs*
10.2.1.6 Estimate necessary profit margin*

Competency 10.2.2: Use and maintain price lists and catalogs*

Competency Builders:

10.2.2.1 Compare prices of similar products and services*
10.2.2.2 Determine material and service availability*
10.2.2.3 Keep product and service catalogs current*

Unit 10: Turf, Landscape, and Nursery Operations
Subunit 10.3: Business Management

Competency 10.3.1: Supervise and manage labor

Competency Builders:

10.3.1.1 Determine amount of labor needed
10.3.1.2 Prepare for periods of peak work loads
10.3.1.3 Maintain clean, safe working environment
10.3.1.4 Recognize importance of efficient and quality work
10.3.1.5 Plan work priorities
10.3.1.6 Train and educate workers
10.3.1.7 Utilize labor efficiently for maximum profit
10.3.1.8 Evaluate worker performance
10.3.1.9 Identify job disciplinary measures
10.3.1.10 Recommend and recognize skills of workers
10.3.1.11 Motivate workers
10.3.1.12 Build rapport among workers
10.3.1.13 Communicate with management
10.3.1.14 Identify rationale for chain of command
10.3.1.15 Hire workers*
10.3.1.16 Evaluate hiring labor versus contracting services*

Competency 10.3.2: Minimize theft*

Competency Builders:

10.3.2.1 Examine effect of theft on profit*
10.3.2.2 Identify potential loss situations*
10.3.2.3 Maintain organized work area*
10.3.2.4 Interpret laws regarding theft*
10.3.2.5 Detect counterfeit currency*
10.3.2.6 Contact authorities*
10.3.2.7 Complete proper paperwork*

Competency 10.3.3: Manage business finance*

Competency Builders:

10.3.3.1 Prepare budget*
10.3.3.2 Calculate insurance needs*
10.3.3.3 Identify sources of business capital*
10.3.3.4 Interpret financial statements*
10.3.3.5 Record accounts payable*
10.3.3.6 Prepare cash flow statements*
10.3.3.7 Calculate overhead costs*

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Unit 10: Turf, Landscape, and Nursery Operations
Subunit 10.4: Facility Maintenance

Competency 10.4.1: Operate irrigation systems

Competency Builders:

10.4.1.1 Follow general safety precautions
10.4.1.2 Determine sprinkler precipitation rate
10.4.1.3 Adjust sprinkler patterns
10.4.1.4 Operate injection systems
10.4.1.5 Adjust water pressure
10.4.1.6 Program automatic timers
10.4.1.7 Hand-water plants
10.4.1.8 Calibrate injection systems
10.4.1.9 Monitor injection systems
10.4.1.10 Troubleshoot problems
10.4.1.11 Winterize systems*

Competency 10.4.2: Design water delivery system*

Competency Builders:

10.4.2.1 Determine required quantity and quality of water*
10.4.2.2 Compare sprinkler, bubbler, and drip irrigation systems*
10.4.2.3 Read and interpret performance charts*
10.4.2.4 Select water source*
10.4.2.5 Select components for irrigation system*
10.4.2.6 Plan distribution system*
10.4.2.7 Identify basic surveying techniques*
10.4.2.8 Calculate water flow*
10.4.2.9 Use drafting equipment*

Unit 10: Turf, Landscape, and Nursery Operations
Subunit 10.5: Equipment Maintenance

Competency 10.5.1: Maintain equipment

Competency Builders:

10.5.1.1 Follow general safety precautions
10.5.1.2 Identify service points
10.5.1.3 Select lubricant
10.5.1.4 Maintain grease fittings
10.5.1.5 Apply lubricant
10.5.1.6 Clean and lubricate drive parts
10.5.1.7 Dispose of used lubricants
10.5.1.8 Calibrate equipment
10.5.1.9 Adjust belts
10.5.1.10 Adjust chains
10.5.1.11 Inspect assembled equipment for operating defects
10.5.1.12 Sharpen equipment
10.5.1.13 Maintain service records

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Competency 10.5.2: Service engine cooling systems

Competency Builders:

10.5.2.1 Follow general safety precautions
10.5.2.2 Test coolant mixture
10.5.2.3 Adjust or replace fan belt
10.5.2.4 Replace hoses
10.5.2.5 Inspect for leaks
10.5.2.6 Add coolant
10.5.2.7 Flush cooling system
10.5.2.8 Clean up and dispose of coolant and containers
10.5.2.9 Troubleshoot problems

Competency 10.5.3: Service engine lubrication systems

Competency Builders:

10.5.3.1 Follow general safety precautions
10.5.3.2 Check oil level
10.5.3.3 Select oil
10.5.3.4 Change oil and oil filters
10.5.3.5 Maintain and replace grease fittings
10.5.3.6 Grease or oil joints
10.5.3.7 Clean up and dispose of oil and containers

Competency 10.5.4: Service small-engine fuel and air systems

Competency Builders:

10.5.4.1 Follow general safety precautions
10.5.4.2 Service air cleaner
10.5.4.3 Bleed diesel fuel system
10.5.4.4 Mix gas and oil for two-cycle engine
10.5.4.5 Service and clean crankcase ventilation components
10.5.4.6 Clean and adjust carburetor
10.5.4.7 Service fuel filter assembly
10.5.4.8 Replace exhaust system components
10.5.4.9 Inspect and clean engine valves
10.5.4.10 Identify proper fuel and tank
10.5.4.11 Add fuel
10.5.4.12 Troubleshoot problems
10.5.4.13 Adjust engine valves*

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Competency 10.5.5: Maintain and service small-engine electrical systems

Competency Builders:

10.5.5.1 Follow general safety precautions
10.5.5.2 Replace spark plugs and wires
10.5.5.3 Clean spark plugs
10.5.5.4 Adjust spark plug gap
10.5.5.5 Check specific gravity of battery
10.5.5.6 Install battery
10.5.5.7 Clean and treat battery terminals, cables, and battery box
10.5.5.8 Charge battery
10.5.5.9 Replace fuses
10.5.5.10 Replace light bulbs
10.5.5.11 Troubleshoot problems
10.5.5.12 Inspect and replace distributor cap and rotor*
10.5.5.13 Inspect and adjust/change breaker points*

Competency 10.5.6: Service hydraulic systems

Competency Builders:

10.5.6.1 Follow general safety precautions
10.5.6.2 Inspect system for oil leaks
10.5.6.3 Clean couplings
10.5.6.4 Inspect hoses
10.5.6.5 Identify proper reservoir
10.5.6.6 Check and add oil
10.5.6.7 Select oil
10.5.6.8 Replace oil filter
10.5.6.9 Clean up and dispose of hydraulic fluids
10.5.6.10 Troubleshoot problems
10.5.6.11 Bleed air from system*
10.5.6.12 Replace hoses*

Competency 10.5.7: Operate power equipment

Competency Builders:

10.5.7.1 Follow general safety precautions
10.5.7.2 Use spreader
10.5.7.3 Use seeder
10.5.7.4 Use rotary tiller
10.5.7.5 Use edger
10.5.7.6 Use blower
10.5.7.7 Use aerator
10.5.7.8 Use roller
10.5.7.9 Use mowing equipment
10.5.7.10 Use trimming equipment
10.5.7.11 Use lawn sweepers
10.5.7.12 Use sod cutter
10.5.7.13 Use chain saw
10.5.7.14 Use verticutter/turf groomers
10.5.7.15 Use tractor

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10.5.7.16 Use spray equipment
10.5.7.17 Use power washer
10.5.7.18 Use straw blowers
10.5.7.19 Use hand-held augers
10.5.7.20 Use power tamps
10.5.7.21 Use skid loader*
10.5.7.22 Use trencher*
10.5.7.23 Use backhoe*
10.5.7.24 Use hydroseeders/mulchers*
10.5.7.25 Use chippers*
10.5.7.26 Use tree spade*
10.5.7.27 Use cutoff saws*
10.5.7.28 Use landscape rake*

Competency 10.5.8: Clean and store equipment

Competency Builders:

10.5.8.1 Follow general safety precautions
10.5.8.2 Remove debris from equipment
10.5.8.3 Use steam or high-pressure wash equipment
10.5.8.4 Prepare engines for storage
10.5.8.5 Lubricate equipment for storage
10.5.8.6 Remove equipment from storage
10.5.8.7 Recognize how to prepare equipment for storage
10.5.8.8 Drain pumping system

Competency 10.5.9: Fabricate with metal

Competency Builders:

10.5.9.1 Follow general safety precautions
10.5.9.2 Punch and drill metal
10.5.9.3 Cut metal
10.5.9.4 Select thread and size for tap or die
10.5.9.5 Thread hole or rod
10.5.9.6 Grind metal
10.5.9.7 Identify types of metal*
10.5.9.8 Design plans*
10.5.9.9 Prepare bill of materials*
10.5.9.10 Test metal for type and hardness*
10.5.9.11 Join metal*
10.5.9.12 Bend sheet metal*

Competency 10.5.10: Maintain and service spraying equipment

Competency Builders:

10.5.10.1 Follow general safety precautions
10.5.10.2 Clean and inspect spray nozzles
10.5.10.3 Select spray nozzles
10.5.10.4 Calibrate equipment
10.5.10.5 Maintain pump spray equipment
10.5.10.6 Inspect hose and connections
10.5.10.7 Pressure-check hoses
10.5.10.8 Clean and inspect tanks
10.5.10.9 Repair and splice hoses
10.5.10.10 Troubleshoot problems

Competency 10.5.11: Maintain and service spreaders

Competency Builders:

10.5.11.1 Follow general safety precautions
10.5.11.2 Oil and lubricate spreader
10.5.11.3 Clean up and dispose of spreader waste
10.5.11.4 Calibrate equipment
10.5.11.5 Adjust and clean blade propellor
10.5.11.6 Troubleshoot problems

Competency 10.5.12: Weld with gas*

Competency Builders:

10.5.12.1 Follow general safety precautions*
10.5.12.2 Set up and adjust gas welding equipment*
10.5.12.3 Select rod*
10.5.12.4 Select and apply flux*
10.5.12.5 Cut metal*
10.5.12.6 Weld steel in horizontal positions*
10.5.12.7 Weld steel with filler rod*
10.5.12.8 Braze metal*
10.5.12.9 Clean and store equipment*
10.5.12.10 Secure and store gas cylinders*

Competency 10.5.13: Weld with electric arc and MIG*

Competency Builders:

10.5.13.1 Follow general safety precautions*
10.5.13.2 Select welding equipment and accessories*
10.5.13.3 Select electrode sizes and types*
10.5.13.4 Select settings*
10.5.13.5 Prepare metal*
10.5.13.6 Weld steel in nonhorizontal positions*
10.5.13.7 Weld steel in horizontal positions*
10.5.13.8 Weld pipe*
10.5.13.9 Cut metal*
10.5.13.10 Clean and store equipment*

Unit 10: Turf, Landscape, and Nursery Operations
Subunit 10.6: Construction Skills

Competency 10.6.1: Construct with stone and pavers

Competency Builders:

10.6.1.1 Follow general safety precautions
10.6.1.2 Excavate for foundation
10.6.1.3 Apply and compact aggregates
10.6.1.4 Grade sand using screed
10.6.1.5 Install edging
10.6.1.6 Lay pavers
10.6.1.7 Lay gravel
10.6.1.8 Set landscape stones
10.6.1.9 Lay stone*
10.6.1.10 Construct wall*
10.6.1.11 Select stone*
10.6.1.12 Face stone*

Competency 10.6.2: Install and maintain electrical systems

Competency Builders:

10.6.2.1 Follow general safety precautions
10.6.2.2 Repair extension cords
10.6.2.3 Install and maintain low-voltage lighting fixtures
10.6.2.4 Replace or reset circuit breakers and fuses*
10.6.2.5 Wire and install outlets and switches*
10.6.2.6 Install electric motors*
10.6.2.7 Repair and splice outdoor wiring*
10.6.2.8 Lubricate motors*
10.6.2.9 Troubleshoot problems*

Competency 10.6.3: Install and maintain fencing

Competency Builders:

10.6.3.1 Follow general safety precautions
10.6.3.2 Lay out fence
10.6.3.3 Install posts and braces
10.6.3.4 Install fasteners
10.6.3.5 Identify options in fencing systems*
10.6.3.6 Determine amount of fence required*
10.6.3.7 Select fencing materials*
10.6.3.8 Select posts and braces*
10.6.3.9 Select fasteners*
10.6.3.10 Install gates*

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Competency 10.6.4: Apply protective coatings

Competency Builders:

10.6.4.1 Follow general safety precautions
10.6.4.2 Clean and sand surface
10.6.4.3 Use steam and high-pressure wash equipment
10.6.4.4 Apply masking tape
10.6.4.5 Thin paint
10.6.4.6 Mix and apply primer coat
10.6.4.7 Apply finish coat
10.6.4.8 Apply wood preservative
10.6.4.9 Determine type of coating*

Competency 10.6.5: Plan electrical installations*

Competency Builders:

10.6.5.1 Follow general safety precautions*
10.6.5.2 Follow electrical codes*
10.6.5.3 Identify electrical needs*
10.6.5.4 Plan distribution system*
10.6.5.5 Plan wiring layouts*
10.6.5.6 Select wire and electrical supplies*
10.6.5.7 Identify alternative electrical sources*

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1900 Kenny Road
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